PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Process for the treatment of Natural Calcium Carbonates, and the products obtained by this process

We, SOCIETE ANONYME DU BLANC OMYA, a French Body Corporate, of 31 rue Cambacères, Paris, France, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

The present invention relates to the treatment of natural calcium carbonates and it is more particularly concerned with a process in which particles of natural calcium carbonates are given a surface coating of an auxiliary substance.

The natural calcium carbonates with which this specification is concerned comprise, in the first place, chalk. All varieties of chalk, such as those found in the Parisian basin and known as Blanc de Meudon, Blanc de Méru, Blanc d'Espagne, Blanc de Troyes, Blanc de Champagne, etc., may be treated according to the present invention. Hard and crystalline calcium carbonates, of the so-called "saccharoid structure," and calcium carbonates of the marble type may also be treated.

The grinding and handling of chalk present difficulties due to the fact that the material, even when dry, clogs very easily and obstructs conduits and the apertures or holes of screens. As a result the efficiency and output of the grinding apparatus and other treating apparatus are considerably reduced. Pulverised chalk particles have a strong tendency to agglomerate and it has been established that, in the ground and finely divided state, particles of chalk or other natural calcium carbonate agglomerate the more readily the finer they are. In numerous applications of the material (for example its addition to rubber, paints, etc.) this agglomeration counter-acts the advantages of having a fine product. In effect, particles having a size of from 0.5 to 1.0 micron behave like particles having a size of from 3 to 5 or even 10 microns.

The present invention avoids the disadvantages of clogging, permits the dispersion of the fine particles and, in addition, improves the properties of the calcium carbonate when applied.

According to the invention, we provide a process for the treatment of natural calcium carbonate in which the grinding of said carbonate is effected in the presence of one or more higher fatty acids at a temperature at least equal to that at which carbonic acid is displaced from the carbonate by the fatty acid or acids. By the term "higher fatty acid" we mean a fatty acid having at least 12 carbon atoms in the molecule.

The process according to the invention results in a chemical reaction between the calcium carbonate and the fatty acid or acids to form on the carbonate particles an adherent coating of the calcium salt or salts of the fatty acid or acids. By employing the process according to the invention it is found that the delivery from the grinding apparatus is considerably increased and at the same time the fineness of the coated carbonate particles is improved.

Preferably the higher fatty acid or acids used are those contained in natural glycerides, of vegetable or animal origin, the proportion of the fatty acid or acids in relation to the calcium carbonate being preferably from 0.1 to 10 per cent by weight.

The minimum temperature employed depends on the fatty acid or acids used but, as a rule, it should be at least 80°C. The raising of the temperature caused by the grinding of the calcium carbonate in the apparatus concerned (for example, hammer-mills of the micropulveriser type, pebble mills of the Raymond type, ball mills or roller mills) clearly is insufficient for ensuring the desired result and, consequently, it is necessary to supply heat in carrying out the process according to the invention.

The supply of heat may be effected in

many ways but, according to a preferred method, preheated calcium carbonate is introduced into the mill, for example at a temperature of from 60° to 200°C., preferably about 120°C.

Obviously it is important to distribute the fatty acid or acids in as homogeneous a manner as possible in the mass of calcium carbonate, particularly when these acids are to be added in a relatively small proportion. In the case of a fatty acid which is liquid at the grinding temperature, it may be projected as a very fine rain or mist (for example, by means of a high pressure spray) on to the calcium carbonate before the latter enters the mill or into the body of the mill at a short distance downstream from the feeding orifice.

In the case of a fatty acid which is solid at the temperature concerned, it may be powdered very finely and then mixed intimately with the carbonate before the entry of the latter into the mill. It may also be introduced as a powder into the mill, for example by means of a vibrating feeder the delivery from which is proportional to the feed of the carbonate. Again, it may be introduced as a rain or mist after having been raised to a temperature above its melting point.

In addition to improving the fineness of the coated calcium carbonate particles the presence of the calcium salts of the fatty acid or acids presents other advantages. These advantages are particularly noticeable in cases in which the coated calcium carbonate is used as a filler in plastics, especially polyvinyl chloride and copolymers of vinyl chloride and other monomers capable of copolymerisation. In these cases the calcium salt or salts of the fatty acid or acids act as stabilisers for the mixtures. Likewise, in paints, it is the calcium salt of the fatty acid which gives to the filler the ability to remain suspended for a protracted period.

What we claim is :—

1. A process for the treatment of natural calcium carbonate, in which the grinding of said carbonate is effected in the presence of one or more higher fatty acids at a temperature at least equal to that at which carbonic acid is displaced from the carbonate by the fatty acid or acids.

2. A process according to Claim 1, wherein the grinding is effected at a temperature of at least 80°C.

3. A process according to Claim 1 or Claim 2, wherein the carbonate is introduced into the grinding apparatus in a pre-heated condition.

4. A process according to any of Claims 1 to 3, wherein the fatty acid is, or fatty acids are, added in the liquid state in the form of a fine rain or mist to the calcium carbonate before, during or shortly after its entry into the grinding apparatus.

5. A process according to any of Claims 1 to 4, wherein the fatty acid is, or fatty acids are, added as a fine powder to the calcium carbonate either before or during the entry of the latter into the grinding apparatus.

6. A process according to any of Claims 2 to 5, wherein the proportion of the fatty acid or fatty acids added, in relation to the calcium carbonate, is from 0.1 to 10 per cent by weight.

7. Natural calcium carbonate which has been treated by the process claimed in any of Claims 1 to 6.

8. Plastic materials or paints containing the calcium carbonate claimed in Claim 7.

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